2000

OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **PLEASANT POND, FRANCESTOWN** the program coordinators recommend the following actions.

Welcome to the New Hampshire Volunteer Lake Assessment Program! As you continue your participation in VLAP the database you create for your water body will help you track trends in lake quality and identify potential problems. As a rule of thumb, try to sample once per month during the summer. Other special sampling programs include monitoring for non-point sources of pollution to the lake, and more frequent, long-term sample collection to establish a complex data set of your lake's water quality. We understand that future sampling will depend upon volunteer availability, water monitoring goals, and funding. **Trend analysis is not feasible with only a few data points.** It can take a few years of data collection to obtain an adequate set of baseline data. Frequent and consistent sampling will ensure useful data for future analyses. Contact the VLAP Coordinator this spring to schedule our annual lake visit. If your group feels they need a refresher in sampling techniques, call us early to make an appointment. Please consult the Interpreting Data and Monitoring Parameters sections of this report when trying to understand data.

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The current year data (the top graph) show in-lake chlorophyll-a is *fairly low*. Concentrations decreased from July to August, a trend that is not typical in many lakes of New Hampshire. The chlorophyll-a average for Pleasant Pond is half that of the state mean. We will watch for this trend to continue in the future. While algae are present in all lakes, an excess amount of any type is not welcomed. Pleasant Pond has a diverse and healthy mix of algae common to New Hampshire's lakes and ponds at this time. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows in-lake transparency is greater than the state mean. The clarity increased from July to August, corresponding with the decrease in chlorophyll-a. This is a positive trend that we hope will persist. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show in-lake phosphorus levels are *low* in the epilimnion and *average* in the hypolimnion. Consult the Chemical Monitoring Parameters section of the report for the ranges of Total Phosphorus. Again, there was a decrease from July to August of hypolimnetic phosphorus. Our goal is to keep phosphorus levels at a minimum. See the Other Comments section below for more information about this. The average concentration of both layers was below the state median for total phosphorus. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Dissolved oxygen was low in the hypolimnion in July (Table 9). This may be due in part to drifting during the testing, which may have caused the oxygen probe to come in contact with sediments in shallower water, thereby skewing the reading. However, the total phosphorus concentration was slightly elevated at that time. It is possible that the bottom sediments were being stirred by the anchor dragging along the bottom, thereby releasing excess amounts of phosphorus into the water column. By sampling any inlets, whether they are seasonal or year-round, we will be able to determine if excess nutrients are entering the pond from the surrounding watershed. Contact the VLAP Coordinator in the spring to discuss some options, and also to schedule the annual visit by DES personnel.

- The conductivity levels in the Pleasant Pond watershed are very low (Table 6). Generally, we consider conductivity below 100 µS/cm to be unpolluted water. However, it is difficult to create an average for the state as the composition of the watershed can influence conductivity levels. Conductivity was particularly low this year, most likely as a result of the excess rains, which tend to flush out any pollutants. Conductivity increases often indicate the influence of human activities on surface waters. Septic system leachate, agricultural runoff, iron deposits, and road runoff can all influence conductivity.

- Phosphorus is above average for the North Inlet (Table 8). This is likely due to the stagnant waters that are found at the mouth of the pond. Stagnant or shallow waters can concentrate nutrients and pollutants and make the results appear worse than they are. It would be useful to find an area of the inlet upstream where the water is flowing so we can more accurately assess the water quality.

NOTES

- Monitor's Note (8/29/00): Inlet water flow still.

USEFUL RESOURCES

Lake Protection Tips: Some Do's and Don'ts for Maintaining Healthy Lakes, WD-BB-9, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Sand Dumping - Beach Construction, WD-BB-15, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

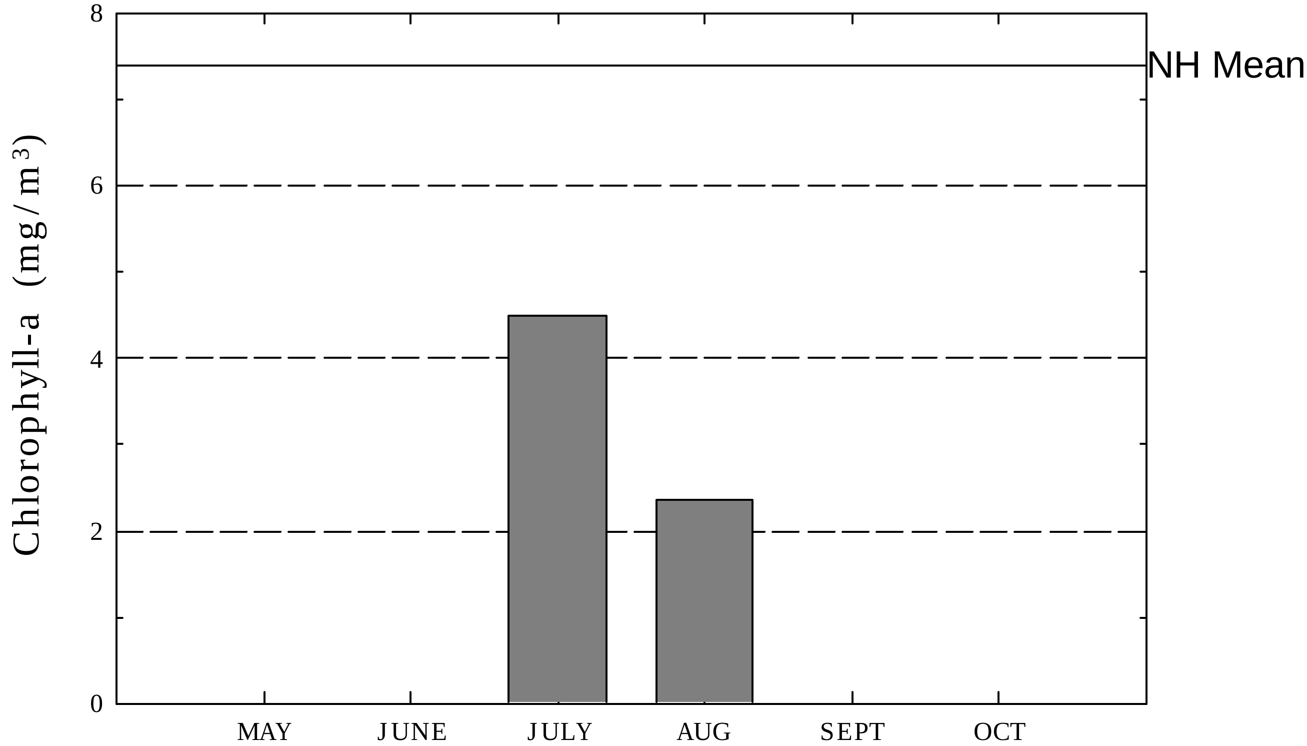
Effects of Phosphorus on New Hampshire's Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

What is a Watershed?, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

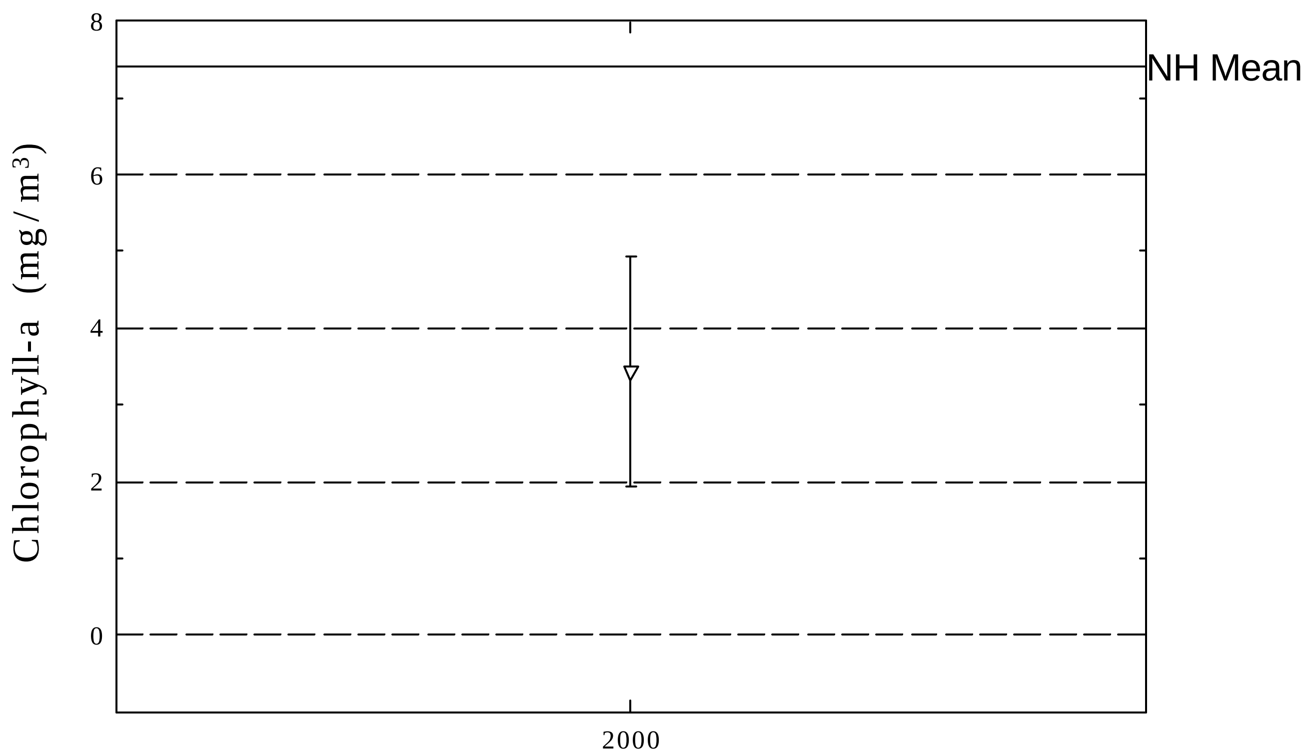
Road Salt and Water Quality, WD-WSQB-7, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Pleasant Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



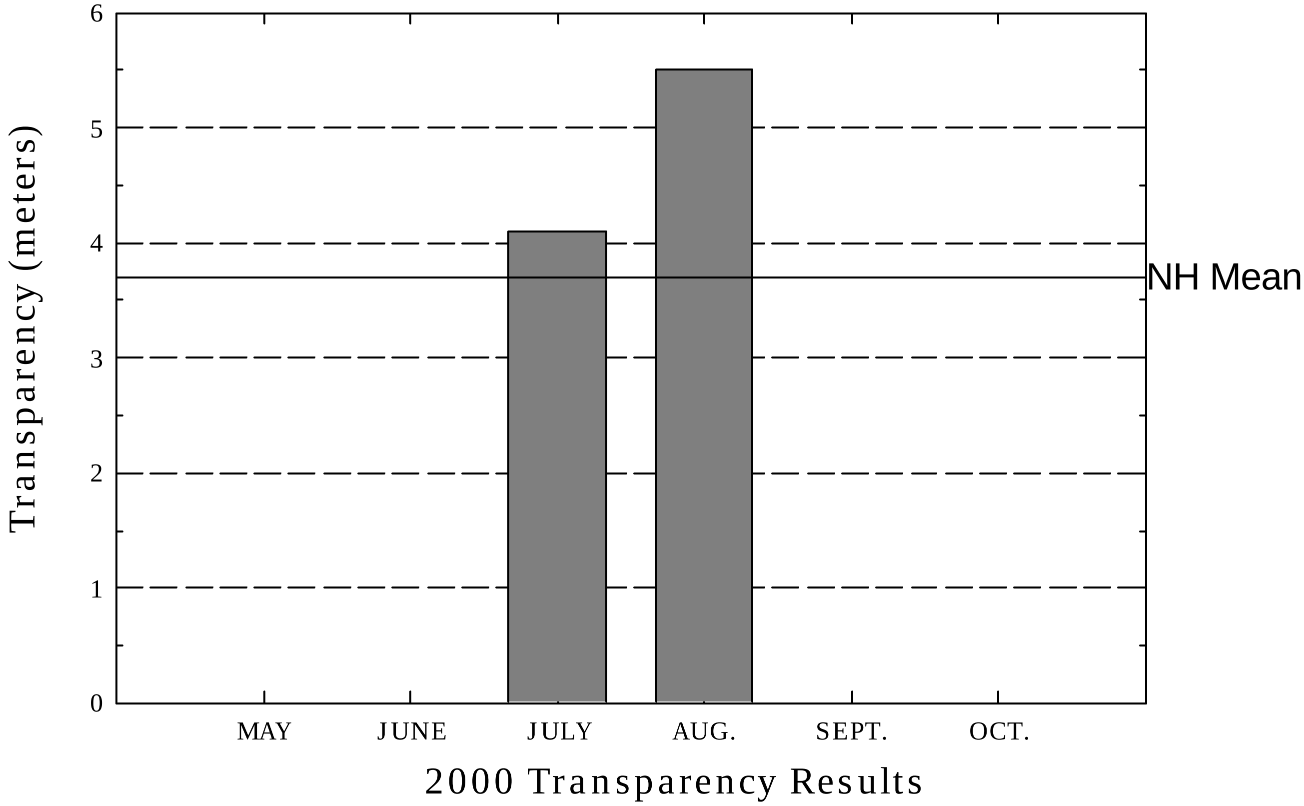
2000 Chlorophyll-a Results

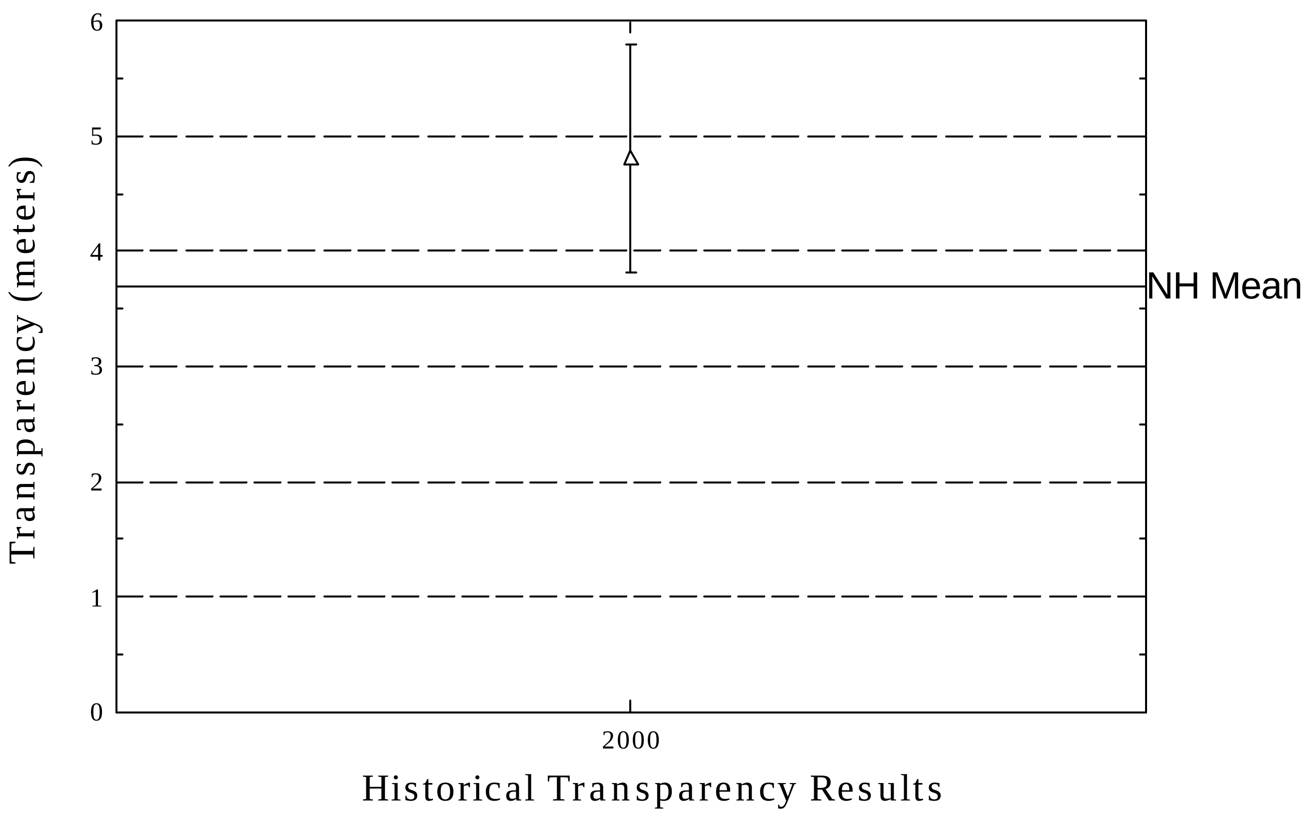


Historical Chlorophyll-a Results

Pleasant Pond

Figure 2. Monthly and Historical Transparency Results





Pleasant Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

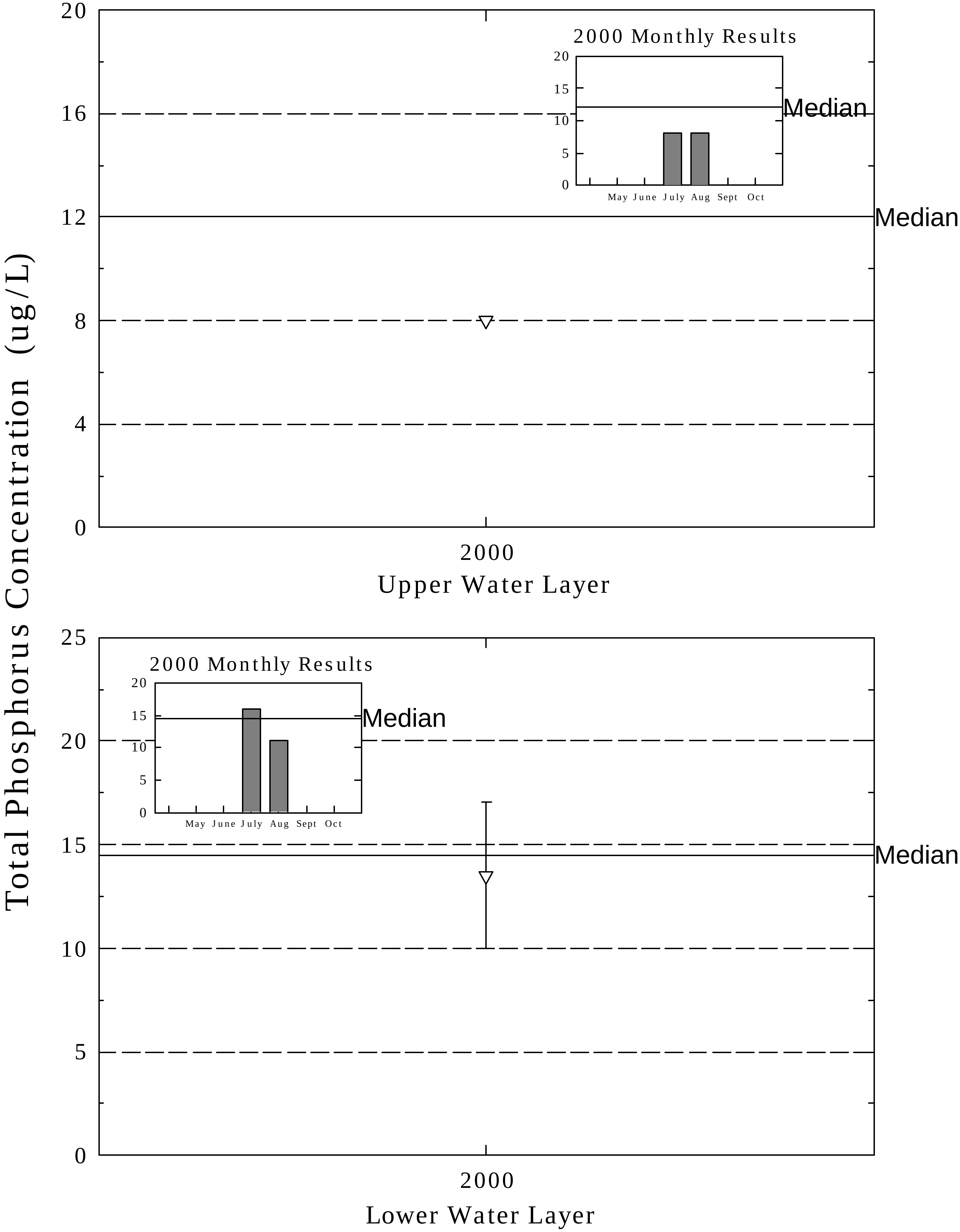


Table 1.

PLEASANT POND

FRANCESTOWN

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
2000	2.37	4.50	3.43

Table 2.

PLEASANT POND

FRANCESTOWN

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
07 / 17 / 2000	DINOBRYON	50
	ASTERIONELLA	36
	MALLOMONAS	7

Table 3.

PLEASANT POND

FRANCESTOWN

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
2000	4.1	5.5	4.8

Table 4.

PLEASANT POND

FRANCESTOWN

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
DAM				
	2000	6.15	6.28	6.21
EPILIMNION				
	2000	6.49	6.70	6.58
HYPOLIMNION				
	2000	6.07	6.37	6.19
NORTH INLET				
	2000	5.95	6.31	6.09

Table 5.

PLEASANT POND

FRANCESTOWN

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
2000	2.90	3.10	3.00

Table 6.

PLEASANT POND
FRANCESTOWN

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
DAM				
	2000	22.6	22.7	22.6
EPILIMNION				
	2000	22.3	22.7	22.5
HYPOLIMNION				
	2000	22.7	23.5	23.1
NORTH INLET				
	2000	21.2	22.2	21.7

Table 8.

PLEASANT POND

FRANCESTOWN

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	**Year**	**Minimum**	**Maximum**	**Mean**
DAM				
	2000	< 5	7	6
EPILIMNION				
	2000	8	8	8
HYPOLIMNION				
	2000	11	16	13
NORTH INLET				
	2000	13	21	17

Table 9.

PLEASANT POND
FRANCESTOWN

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 17, 2000			
0.1	23.1	7.3	85.0
1.0	23.0	7.2	83.8
2.0	23.0	7.2	83.5
3.0	22.9	7.2	83.3
4.0	22.5	6.4	73.7
5.0	19.2	0.3	3.5
6.0	16.4	0.2	2.3

Table 10.

PLEASANT POND

FRANCESTOWN

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 17, 2000	6.0	16.4	0.2	2.3

Table 11.

PLEASANT POND

FRANCESTOWN

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
DAM				
	2000	0.3	0.4	0.4
EPILIMNION				
	2000	0.2	0.5	0.4
HYPOLIMNION				
	2000	0.4	0.6	0.5
NORTH INLET				
	2000	0.4	0.5	0.5